

REMARKS

Claims 1, 7, 8 and 14 currently appear in this application. The Office Action of February 15 and the Advisory Action of June 18, 2007, have been carefully studied. These claims define novel and unobvious subject matter under Sections 102 and 103 of 35 U.S.C., and therefore should be allowed. Applicant respectfully requests favorable reconsideration, entry of the present amendment, and formal allowance of the claims.

Allowable Subject Matter

In the Advisory Action of June 18, 2007, the Examiner indicated that amending the claims to recite that the absorption maxima are greater than 450 nm and absorbing in the 390-450 nm range to describe the dyes would obviate the rejection over Maeda et al. JP 11-053738 or Kanno et al '467.

Amendments to the Claims

Claim 1 has been amended by incorporating into claim 1 the limitations of claims 2-4. Furthermore, "an organic dye compound" has been further limited to one "having an absorption maximum at a wavelength of longer than 450 nm, absorbing light with a wavelength of 390-450 nm." As described in the specification as filed at page 13, lines 18-22, dye compounds represented by Chemical Formulae 20-38 have

an absorption maximum in the regions with wavelengths longer than 450 nm. In fact, as shown in the Table attached hereto, the organic dye compounds represented by Chemical Formulae 19 to 38 have an absorption maximum "at a wavelength of more than 40 nm longer than 450 nm."

Claims 2-4 have been cancelled, as their subject matter has been incorporated into claim 1.

Claim 8 has been amended in a manner similar to claim 1, i.e., the subject matter of claims 9-11 has been incorporated into claim 8, and "an organic dye compound" has been further limited to one "having an absorption maximum at a wavelength of 450 nm, absorbing light with a wavelength of 390-450 nm."

Art Rejections

Claims 1 and 8 are rejected under 35 U.S.C. 102(e) as being fully anticipated by Ohgo et al., US 6,269,072 as evidenced by Mills, *J. Chem. Soc.* Pp. 455-466, 1922. The Examiner states that Ohgo teaches an optical recording medium in embodiment 8, where a grooved substrate is coated with a gold reflective layer and a recording layer of monomethine benzothiazine dye where R are C₁₋₃ alkyl moieties and then a protective layer formed as in embodiment 1. Mills is said to teach that 2,2'-diethylthiocyanaine iodide has two absorption maxima: the stronger at 423 nm and the weaker at 400 nm.

This rejection is respectfully traversed.

Claims 1 and 8 have been amended to include the limitations of claims 2-4 and 9-11, respectively. As none of claims 2-4 or 9-11 has been rejected as being anticipated by Ohgo, it is respectfully submitted that the amendments to claims 1 and 8 have overcome this rejection.

Claims 1, 2, 7-9 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohgo in view of Mills and Nanba et al., JP 60-204396. The Examiner states that Nanba discloses an example (Example 3) in which dye D36 has an absorption maximum at 880 nm, which is greater than the wavelength of writing light of 830 nm, and that the dye is used with dye D32 and metal chelate Q3-12. The Examiner further states that the use of dyes which have an absorption maximum within the range of 40 nm shorter and 70 nm longer than the writing wavelength is disclosed in the abstract of Nanba. Nanba is said to disclose at page 28, the use of lasers including HeNe (632.8 nm), argon ion (488, 514.5 nm), HeCd (442 and 325 nm). The Examiner's position is that it would have been obvious to modify the Ohgo medium by using other counter ions, such as the perchlorate, tetrafluoroborate or aryl sulfonic acids disclosed by Nanba as equivalent to iodate in the right column of page 8 with a reasonable expectation of forming a useful optical recording medium.

This rejection is respectfully traversed. Since the dyes in Nanba have absorption maxima within the range of 40 nm shorter and 70 nm longer than the writing wavelength, the absorption maximum of dye D36 must be in the range of 790 nm (*i.e.*, 830 nm - 40 nm) to 900 nm (*i.e.*, 830 nm + 70 nm). That means that dye D36 cannot be used in an optical recording medium in which information is written with HeNe (632.8 nm), argon ion (48, 514.4 nm) or HeCd (442 and 325) lasers, because the absorption maximum of dye D36 is not within the range of 40 nm shorter and 70 nm longer than the wavelengths of these lasers. In other words, Nanba teaches that dye D36 cannot be used in the herein claimed optical recording medium, which uses a laser with an oscillation wavelength of about 405 nm.

There is nothing in the combination of Ohgo, Mills and Nanba that teaches an optical recording medium as claimed herein, which optical recording medium:

- i. uses a laser with an oscillation wavelength of about 405 nm as writing light;
- ii. uses an organic dye compound having an absorption maximum at a wavelength of longer than 450 nm and absorbing light with a wavelength of 390-450 nm,
- iii. has a recording capacity of over 15 GB per side when formed into a disc 12 cm in diameter,

- iv. writes information by forming minute pits with a pit/groove width of below 1 micron/pit at a track pitch of below 1 micron, and
- v. uses an organic dye compound represented by any one of Formulae 1 to 3 and includes a light-resistant improver.

Accordingly, it is respectfully submitted that claims 1, 7, 8 and 14 as amended define patentable subject matter, and allowance of these claims is respectfully requested.

Claims 1, 2, 4, 7-9, 11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda et al., JP 11-053758 and Usami et al., US 6,341,122 in view of Nanba. The Examiner has suggested that this rejection could be obviated by reciting that the dyes have an absorption maximum at a wavelength of 450 nm or more and are able to be recorded with wavelengths in the 380-405 nm range.

Claims 1 and 8 have been amended in accordance with the Examiner's helpful suggestion. Claims 1 and 8 are now limited to organic dye compounds "having an absorption maximum at a wavelength of 450 nm, absorbing light with a wavelength of 390-450 nm." As to the wavelength of writing light, claims 1 and 8 already recite that "information is recorded by using a laser with an oscillation wavelength of about 405 nm."

As shown in the Table submitted herewith, the organic compounds represented by Chemical Formulae 19 to 38, which read on any one of Formulae 1 to 3 in claims 1 and 8, all have absorption maxima at a wavelength over 450 nm, which is longer than the laser having an oscillation wavelength of 450 nm.

The Examiner has questioned whether 4-N,N-diethylamino-4'-nitrosodiphenylamine can sensitize the recording media, since 4-N,N-diethylamino-4'-nitrosodiphenylamine has an absorption maximum at 440 nm. Since claims 1 and 8 have been amended to limit the organic dye compound used in the optical recording medium as claimed to one "having an absorption maximum at a wavelength of more than 40 nm longer than 450 nm," it is self-evident that 4-N,N-diethylamino-4'-nitrosodiphenylamine is no longer included in the dyes claimed herein.

Claims 1-4, 7-11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda et al. and Usami et al. in view of Nanba and Kanno, US 6,063,467 and further in view of Ootaguro et al., US 5,318,882.

This rejection is respectfully traversed.

Maeda discloses a trimethine cyanine dye that has an absorption maximum of around 400-470 nm, and is used in an optical recording medium on which information is written with

a laser having an oscillation wavelength of 515 nm (paragraph 0012). While Maeda discloses trimethine cyanine dyes having an absorption maximum that overlaps in part with that of the organic dye compounds claimed herein, the optical recording medium of Maeda is completely different from that of the herein claimed invention in its writing mechanism. The optical recording medium of Maeda uses, as a writing light, a laser having an oscillation wavelength longer than the absorption maximum of the dye. Contrary to this, the optical recording medium claimed herein uses, as a writing light, a laser having an oscillation wavelength shorter than the absorption maximum of the dye. In this regard, the writing mechanisms in an optical recording medium of the claimed invention is totally new. There is no suggestion in Maeda of an optical recording medium as defined in claim 1.

Kanno teaches nothing about an absorption maximum of the compounds disclosed therein. However, an optical recording medium disclosed in Kanno uses as a writing light a laser having an oscillation wavelength of about 405 nm.

Since the wavelength of the writing light of the herein claimed invention is shorter than that of Kanno, it is theoretically clear that the recording capacity of the claimed recording medium would be larger than that of Kanno. Kanno never discloses or suggests an optical recording medium on

which information is written with a laser having an oscillation wavelength of around 405 nm that is shorter than the absorption maximum of the dye.

Ootaguro, while it discloses nitrosodiphenylamine as a light-resistant improver for a specified cyanine dye, does not teach that nitrosodiphenylamine is useful as a light-resistance improver for all cyanine dyes. It is respectfully submitted that it would have been difficult for one skilled in the art at the time the present invention was made to use nitrosodiphenylamine in combination with the organic dye compounds recited in claim 1 with a reasonable expectation of success.

Furthermore, it should be noted that an optical recording medium having a recording capacity of over 15 GB per side when formed into a disk 12 cm in diameter had not been known at the time Ootaguro's invention was made in 1991. It is therefore respectfully submitted that it would not have been obvious to obtain an optical recording medium as claimed herein by relying on the disclosure of Ootaguro.

It is respectfully submitted that the combination of Maeda, Usami, Nanba, Kanno and Ootaguro does not teach or suggest an optical recording medium which:

- i. uses a laser with an oscillation wavelength of about 405 nm as writing light,

- ii. uses an organic dye compound having an absorption maximum at a wavelength of 450 nm, absorbing light with a wavelength of 390-450 nm,
- iii. has a recording capacity of over 15 GB per side when formed into a disk 12 cm in diameter,
- iv. writes information by forming minute pits with a pit/groove width of below 1 micron/pit at a track pitch of below 1 micron, and
- v. uses an organic dye compound represented by any one of Formulae 1 to 3 and includes a light-resistant improver.

Accordingly, it is believed that claims 1, 7-8 and 14 define allowable subject matter.

Claims 1, 2, 4, 7-9, 11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda and Usami in view of Nanba, Kanno, GB 2,329,751 and Ootaguro.

This rejection is respectfully traversed. Kanno discloses, at pages 5-9, an optical recording medium using styryl dyes that are suitable for a laser having an oscillation wavelength of 500 nm to 700 nm. Kanno, however, teaches nothing about an optical recording medium that uses a laser with an oscillation wavelength of about 405 nm as writing light and having a recording capacity of more than 15

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GB per side when formed into a disk 12 cm in diameter. There is nothing in any of Maeda, Usami, Nanba or Ootaguro that supplies the deficiencies in the Kanno disclosure.

In view of the above, it is respectfully submitted that the claims are now in condition for allowance, and favorable action thereon is earnestly solicited.

Respectfully submitted,

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Table

Chemical Formula	λ_{max} in methanol solution (nm)
19	767
20	544
21	545
22	545
23	502
24	543
25	547
26	546
27	525
28	525
29	530
30	536
31	525
32	540
33	550
34	around 580
35	524
36	around 580
37	around 580
38	around 580